

Claims

What is claimed is:

1. A method for determining whether a sound field is intended for production in one channel pair or a plurality of channel pairs, comprising:
 - 5 detecting one or more sound events in the sound field;
 - determining a direction of a power of the sound field, when any of the one or more sound events are detected;
 - 10 determining a number of instances in which the direction of the power of the sound field includes a predetermined direction;
 - determining whether the number exceeds a value; and
 - 15 determining that the sound field is intended for production in the plurality of channel pairs, if the number exceeds the value.
2. The method of Claim 1, further comprising determining that the sound field is intended for production in the one channel pair, if the number does not exceed the value.
3. The method of Claim 1, where detecting the one or more sound events in the sound field includes detecting the one or more sound events an input channel pair.
4. The method of Claim 3, where the input channel pair is a center-surround input channel pair.
- 20 5. The method of Claim 1, where the predetermined direction is a rear direction.
6. The method of Claim 1, where the value is about 2 to about 3.
7. The method of Claim 1, where the predetermined direction is between about zero degrees and about -22,5 degrees.
8. The method of Claim 1, further comprising determining a duration of the one or more sound events.
- 25 9. The method of Claim 8, further comprising determining whether the duration of the one or more sound events exceed about a predetermined duration.
10. The method of Claim 9, where the one or more sound events include a sound event type and the predetermined duration is that of the detected sound event type.
- 30 11. The method of Claim 9, where the predetermined duration is about 50ms.
12. The method of Claim 9, where the predetermined duration is about 200ms to about 300ms.

13. The method of Claim 9, where determining the direction of the power of the sound field includes determining the direction of the power of the sound field when the duration of the one or more sound events exceed about the predetermined duration.

5 14. The method of Claim 9, where determining the number of instances includes determining the number of instances in which the power of the sound field for the one or more sound events that exceed about the predetermined duration, exceeds the value.

15. The method of Claim 1, where detecting the one or more sound events includes detecting the one or more sound events in a time period.

10 16. The method of Claim 15, where the time period is about 10 seconds to about 15 seconds.

15 17. A method for determining whether a sound field is intended for production in one channel pair or a plurality of channel pairs, comprising:

detecting a plurality of sound event types in the sound field;

determining a direction of a power of the sound field, when any of the plurality of sound event types is detected;

20 determining a number of instances in which the direction of the power of the sound field includes a predetermined direction;

determining whether the number exceeds a value; and

25 determining that the sound field is intended for production in the plurality of channel pairs, if the number exceeds a value.

18. The method of Claim 17, further comprising determining that the sound field is intended for production in one channel pair, if the number does not exceed a value.

19. The method of Claim 17, where the one of the plurality of sound event types that is detected defines a detected sound event type and the method further comprises determining 25 the duration of the detected sound event.

20. The method of Claim 19, further comprising determining whether the duration of the detected sound event type exceeds about a predetermined duration.

21. The method of Claim 20, where the predetermined duration is that of the detected sound event type.

30 22. The method of Claim 20, where determining the direction of the power of the sound field includes determining the direction of the power of the sound field when the duration of the detected sound event type exceeds about the predetermined duration.

23. The method of Claim 17, where detecting the plurality of sound event types includes detecting the plurality of sound event types in a time period.

24. A computer readable medium comprising computer-executable instructions for performing a method for determining whether a sound field is intended for production in one input channel pair or a plurality of input channel pairs, comprising the steps of:

5 detecting one or more sound events in the sound field;

 determining a direction of a power of the sound field, when any of the one or more sound events are detected;

10 determining a number of instances in which the direction of the power of the sound field includes a predetermined direction;

 determining whether the number exceeds a value; and

15 determining that the sound field is intended for production in the plurality of input channel pairs, if the number exceeds the value.

25. A computer readable medium comprising computer-executable instructions for performing a method for determining whether a sound field is intended for production in one input channel pair or a plurality of input channel pairs, comprising the steps of:

 detecting a plurality of sound event types in the sound field;

 determining a direction of a power of the sound field, when any of the plurality of sound event types is detected;

20 determining a number of instances in which the direction of the power of the sound field includes a predetermined direction;

 determining whether the number exceeds a value; and

 determining that the sound field is intended for production in the plurality of channel pairs, if the number exceeds a value.

25. An electromagnetic signal embodying computer-executable instructions for determining whether a sound field is intended for production in one input channel pair or a plurality of input channel pairs, the computer-executable instructions comprising the steps of:

 detecting one or more sound events in the sound field;

 determining a direction of a power of the sound field, when any of the one or more sound events are detected;

30 determining a number of instances in which the direction of the power of the sound field includes a predetermined direction;

- determining whether the number exceeds a value; and
determining that the sound field is intended for production in the plurality of input channel pairs, if the number exceeds the value.
27. An electromagnetic signal embodying computer-executable instructions for
5 determining whether a sound field is intended for production in one input channel pair or a plurality of input channel pairs, the computer-executable instructions comprising the steps of:
detecting a plurality of sound event types in the sound field;
determining a direction of a power of the sound field, when any of the plurality of sound event types is detected;
10 determining a number of instances in which the direction of the power of the sound field includes a predetermined direction;
determining whether the number exceeds a value; and
determining that the sound field is intended for production in the plurality of channel pairs, if the number exceeds a value.
28. An apparatus for determining whether a sound field is intended for production in one channel pair or a plurality of channel pairs, comprising:
15 a sound event detector in communication with the sound field and producing a first signal indicating when a sound event is detected;
a sound event localizer in communication with the sound event detector, where when the first signal indicates that the sound event is detected, the sound event localizer produces a 20 second signal indicating a direction of a power of the sound field;
a detector in communication with the sound event detector and producing a third signal indicating whether the direction of the power of the sound field includes a predetermined direction; and
25 a counter in communication with the detector and producing a fourth signal indicating whether a number of instances for which the direction of the power of the sound field that includes the predetermined direction exceeds a value, and if the number exceeds the value, the counter produces the fourth signal indicating that the sound field is intended for production in the plurality of channel pairs.
29. The apparatus of Claim 28, further comprising, if the number does not exceed the value, the counter produces the fourth signal indicating that the sound field is intended for production in the one channel pair.
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30. The apparatus of Claim 28, where the sound event detector is in communication with a center-surround input channel pair.

31. An apparatus for determining whether a sound field is intended for production in one channel pair or a plurality of channel pairs, comprising:

5 a sound event detector in communication with the sound field and producing a first signal indicating when any of a plurality of sound events is detected;

a sound event localizer in communication with the sound event detector and when the first signal indicates that one of the plurality of sound events is detected, the sound event localizer produces a second signal indicating a direction of a power of the sound field;

10 a detector in communication with the sound event detector and producing a third signal indicating whether the direction of the power of the sound field includes a predetermined direction; and

15 a counter in communication with the detector, where the counter produces a fourth signal indicating whether a number of the direction of the power of the sound field that includes the predetermined direction exceeds a value, where if the number exceeds the value, the counter produces the fourth signal indicating that the sound field is intended for production in the plurality of channel pairs.

32. The apparatus of Claim 31, further comprising, if the number does not exceed the value, the counter produces the fourth signal indicating that the sound field is intended for 20 production in the one channel pair.

33. The apparatus of Claim 31, where the sound event detector is in communication with a center-surround input channel pair.

34. An apparatus for determining whether a sound field is intended for production in one input channel pair or a plurality of input channel pairs, comprising:

25 means for detecting one or more sound events in the sound field;

means for determining a direction in communication with the means for detecting, and determining a direction of a power of the sound field when the means for detecting indicates that the sound event is detected;

30 means for determining a number in communication with the means for determining a direction, where the means for determining the number determines a number of instances in which the direction of the power of the sound field includes a predetermined direction; and

means for determining whether the number exceeds a value in communication with

the means for determining the number.

35. A computer readable medium comprising computer-executable instructions for implementing an apparatus for determining whether a sound field is intended for production in one channel pair or a plurality of channel pairs, the apparatus comprising:

5 a sound event detector in communication with one of the plurality of input channel pairs and producing a first signal indicating when a sound event is detected;

a sound event localizer in communication with the sound event detector, where when the first signal indicates that the sound event is detected, the sound event localizer produces a second signal indicating a direction of a power of the sound field;

10 a detector in communication with the sound event detector and producing a third signal indicating whether the direction of the power of the sound field includes a predetermined direction; and

15 a counter in communication with the detector and producing a fourth signal indicating whether a number of instances for which the direction of the power of the sound field that includes the predetermined direction exceeds a value, and if the number exceeds the value, the counter produces the fourth signal indicating that the sound field is intended for production in the plurality of channel pairs.

36. A computer readable medium comprising computer-executable instructions for implementing an apparatus for determining whether a sound field is intended for production 20 in one channel pair or a plurality of channel pairs, the apparatus comprising:

a sound event detector in communication with the sound field and producing a first signal indicating when any of a plurality of sound events is detected;

25 a sound event localizer in communication with the sound event detector and when the first signal indicates that one of the plurality of sound events is detected, the sound event localizer produces a second signal indicating a direction of a power of the sound field;

a detector in communication with the sound event detector and producing a third signal indicating whether the direction of the power of the sound field includes a predetermined direction; and

30 a counter in communication with the detector and producing a fourth signal indicating whether a number of the direction of the power of the sound field that includes the predetermined direction exceeds a value, where if the number exceeds the value, the counter produces the fourth signal indicating that the sound field is intended for production in the

plurality of channel pairs.

37. A computer readable medium comprising computer-executable instructions for implementing an apparatus for determining whether a sound field is intended for production in one channel pair or a plurality of channel pairs, the apparatus comprising:

5 means for detecting one or more sound events in the sound field;

means for determining a direction in communication with the means for detecting, and determining a direction of a power of the sound field when the means for detecting indicates that any of the one or more sound events are detected;

10 means for determining a number in communication with the means for determining a direction, where the means for determining a number determines a number of instances in which the direction of the power of the sound field includes a predetermined direction; and

means for determining whether the number exceeds a value in communication with the means for determining a number.

38. An electromagnetic signal embodying computer-executable instructions implementing 15 an apparatus for determining whether a sound field is intended for production in one input channel pair or a plurality of input channel pairs, the apparatus comprising:

a sound event detector in communication with the sound field and producing a first signal indicating when a sound event is detected;

20 a sound event localizer in communication with the sound event detector, where when the first signal indicates that the sound event is detected, the sound event localizer produces a second signal indicating a direction of a power of the sound field;

a detector in communication with the sound event detector and producing a third signal indicating whether the direction of the power of the sound field includes a predetermined direction; and

25 a counter in communication with the detector and producing a fourth signal indicating whether a number of instances for which the direction of the power of the sound field that includes the predetermined direction exceeds a value, and if the number exceeds the value, the counter produces the fourth signal indicating that the sound field is intended for production in the plurality of channel pairs.

30 39. An electromagnetic signal embodying computer-executable instructions implementing an apparatus for determining whether a sound field is intended for production in one input channel pair or a plurality of input channel pairs, the apparatus comprising:

a sound event detector in communication with the sound field and producing a first signal indicating when any of a plurality of sound events is detected;

5 a sound event localizer in communication with the sound event detector and when the first signal indicates that one of the plurality of sound events is detected, the sound event localizer produces a second signal indicating a direction of a power of the sound field;

a detector in communication with the sound event detector and producing a third signal indicating whether the direction of the power of the sound field includes a predetermined direction; and

10 a counter in communication with the detector, where the counter produces a fourth signal indicating whether a number of the direction of the power of the sound field that includes the predetermined direction exceeds a value, where if the number exceeds the value, the counter produces the fourth signal indicating that the sound field is intended for production in the plurality of channel pairs.

15 40. An electromagnetic signal embodying computer-executable instructions implementing an apparatus for determining whether a sound field is intended for production in one input channel pair or a plurality of input channel pairs, the apparatus comprising:

means for detecting one or more sound events in the sound field;

20 means for determining a direction in communication with the means for detecting, and determining a direction of a power of the sound field when the means for detecting indicates that the sound event is detected;

means for determining a number in communication with the means for determining a direction, where the means for determining the number determines a number of instances in which the direction of the power of the sound field includes a predetermined direction; and

25 means for determining whether the number exceeds a value in communication with the means for determining the number.